What is claimed is:

1. A method for removing organic material in the fabrication of structures, the method comprising:

providing a substrate assembly having an exposed organic material; and

removing at least a portion of the exposed organic material using a composition having at least one component in a supercritical state, the composition comprising an oxidizer selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2).

2. The method of claim 1, wherein the at least one component in a supercritical state is an oxidizer selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2).

3. The method of claim 2, wherein the at least one component in a supercritical state is sulfur trioxide.

4. The method of claim 3, wherein the composition consists essentially of sulfur trioxide in the supercritical state.

5. The method of claim 1, wherein the composition includes a supercritical component in a supercritical state selected from the group of carbon dioxide (CO_2), ammonia (NH_3), H_2O, nitrous oxide (N_2O), carbon monoxide (CO), nitrogen (N_2), helium (He), neon (Ne), argon (Ar), krypton (Kr), and xenon (Xe).

6. The method of claim 5, wherein the supercritical component is carbon dioxide and the oxidizer is sulfur trioxide.

7. The method of claim 1, wherein the exposed organic material is selected from the group of resist material, photoresist residue, UV-hardened resist, X-ray hardened resist, carbon-fluorine containing polymers, plasma etch residues, and organic impurities from other processes.

8. The method of claim 1, wherein the substrate assembly includes features having aspect ratios greater than about 1 and feature sizes of less than or equal to about 1 micron.

9. The method of claim 8, wherein the substrate assembly includes features having aspect ratios greater than about 1 and feature sizes of less than or equal to about 0.25 microns.

10. A method for removing an organic material of a substrate assembly, the method comprising:

providing a substrate assembly including an exposed organic material; and

exposing the substrate assembly to an oxidizer in a supercritical state, wherein the oxidizer is selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2).

11. The method of claim 10, wherein the oxidizer is sulfur trioxide.

12. The method of claim 11, wherein the exposed organic material is selected from the group of resist material, photoresist residue, UV-hardened resist, X-ray hardened resist, carbon-fluorine containing polymers, plasma etch residues, and organic impurities from other processes.

13. The method of claim 12, wherein the substrate assembly includes features

having a pitch of less than or equal to about 1 micron.

14. A method for removing an organic material of a substrate assembly, the method comprising:

providing a substrate assembly including an exposed organic material; and

exposing the substrate assembly to a composition including an oxidizer and at least one supercritical component, wherein the at least one supercritical component is selected from the group of carbon dioxide (CO_2), ammonia (NH_3), H_2O, nitrous oxide (N_2O), carbon monoxide (CO), nitrogen (N_2), helium (He), neon (Ne), argon (Ar), krypton (Kr), and xenon (Xe), and further wherein the oxidizer is selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2).

15. The method of claim 14, wherein the oxidizer is sulfur trioxide.

16. The method of claim 14, wherein the at least one supercritical component is carbon dioxide.

17. The method of claim 14, wherein the exposed organic material is selected from the group of resist material, photoresist residue, UV-hardened resist, X-ray hardened resist, carbon-fluorine containing polymers, plasma etch residues, and organic impurities from other processes.

18. The method of claim 14, wherein the substrate assembly includes features having aspect ratios greater than about 1 and feature sizes of less than or equal to about 1 micron.

19. An organic material removal composition comprising at least one component in a supercritical state, wherein the composition includes an oxidizer selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2).

20. The composition of claim 19, wherein the at least one component in a supercritical state is the oxidizer selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2).

21. The composition of claim 20 wherein the at least one component in a supercritical state is sulfur trioxide.

22. The composition of claim 21, wherein the composition consists essentially of sulfur trioxide in the supercritical state.

23. The composition of claim 19, wherein the composition includes a supercritical component in the supercritical state selected from the group of carbon dioxide (CO_2), ammonia (NH_3), H_2O, nitrous oxide (N_2O), carbon monoxide (CO), nitrogen (N_2), helium (He), neon (Ne), argon (Ar), krypton (Kr), and xenon (Xe).

24. The composition of claim 23, wherein the supercritical component is carbon dioxide and the oxidizer is sulfur trioxide.

25. An organic material removal composition comprising an oxidizer in a supercritical state, wherein the oxidizer is selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2).

26. The composition of claim 25, wherein the oxidizer is sulfur trioxide.

27. An organic material removal composition comprising:

a first component selected from the group of carbon dioxide (CO_2), ammonia (NH_3), H_2O, nitrous oxide (N_2O), carbon monoxide (CO), nitrogen (N_2), helium (He), neon (Ne), argon (Ar), krypton (Kr), and xenon (Xe), wherein the first component is in a supercritical state; and

a second component selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2).

28. The composition of claim 27, wherein the first component is carbon dioxide.

29. The composition of claim 27, wherein a ratio of the first component to the second component in the supercritical state is in the range of about 1:100 by volume to about 100:1 by volume.

30. The composition of claim 27, wherein the second component is sulfur trioxide and the first component is carbon dioxide.

31. The composition of claim 30, wherein a ratio of carbon dioxide:sulfur trioxide is preferably in the range of about 10:1 by volume to about 1:1 by volume.

32. The composition of claim 30, wherein the sulfur trioxide is in a supercritical state.

33. A method for use in fabricating a semiconductor structure, the method comprising the steps of:

providing a pressurizable chamber;

introducing at least one component of a composition into the chamber;

positioning a substrate assembly having exposed organic material within the chamber;

controlling pressure and temperature of the chamber for maintaining the at least one component of the composition in a supercritical state, the composition comprising an oxidizer selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2); and

removing at least a portion of the organic material from the substrate assembly using the composition having the at least one component in the supercritical state.

34. The method of claim 33, wherein the at least one component in a supercritical state is an oxidizer selected from the group of sulfur trioxide (SO_3), sulfur dioxide (SO_2), nitrous oxide (N_2O), NO, NO_2, ozone (O_3), hydrogen peroxide (H_2O_2), F_2, Cl_2, Br_2, and oxygen (O_2).

35. The method of claim 34, wherein the at least one component in a supercritical state is sulfur trioxide.

36. The method of claim 35, wherein the composition consists essentially of sulfur trioxide in the supercritical state.

37. The method of claim 33, wherein the composition includes a supercritical component in a supercritical state selected from the group of carbon dioxide (CO_2), ammonia (NH_3), H_2O, nitrous oxide (N_2O), carbon monoxide (CO), nitrogen (N_2), helium (He), neon (Ne), argon (Ar), krypton (Kr), and xenon (Xe).

38. The method of claim 37, wherein the supercritical component is carbon

dioxide and the oxidizer is sulfur trioxide.

39. The method of claim 33, wherein the exposed organic material is selected from the group of resist material, photoresist residue, UV-hardened resist, X-ray hardened resist, carbon-fluorine containing polymers, plasma etch residues, and organic impurities from other processes.

40. The method of claim 33, wherein the substrate assembly includes features having aspect ratios greater than about 1 and feature sizes of less than or equal to about 1 micron.

41. A method for use in fabricating a semiconductor structure, the method comprising the steps of:

providing a pressurizable chamber;

positioning a substrate assembly having exposed organic material within the chamber;

introducing sulfur trioxide into the chamber;

controlling pressure and temperature of the chamber for maintaining the sulfur trioxide in a supercritical state; and

removing at least a portion of the remaining organic material from the substrate assembly using the etching composition with the at least one component in the supercritical state.

42. The method of claim 41, wherein the substrate assembly includes a photoresist layer defining features in an underlying layer, wherein the substrate assembly includes features having aspect ratios greater than about 1 and feature sizes of less than or equal to about 1 micron.

Add C6